###### COURSE SYLLABUS

###### Semester: Year: 2013

**Mission Statement:**

Richard J. Daley College provides high-quality education which leads to academic success, career development, and personal enrichment that fulfill diverse community needs.

###### Course (Discipline): Manufacturing Technology Number: 112-1 Section:       IAI#:

**Course Title:** Machining Processes II **Length of Course (Weeks):** 16

**Credit Hours:** 3 **Lecture Hours:** 1 **Lab Hours:** 4 **Contact Hours:** 5

**Meeting Day(s):**       **Times:**       **Building:**       **Classroom #:**

**Syllabus can be found on Blackboard website at** [**https://ccc.blackboard.com/webapps/login/**](https://ccc.blackboard.com/webapps/login/)**.**

###### Dean, College to Careers in Advanced Manufacturing \_\_Ray Prendergast\_\_\_\_\_\_\_

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**Course Description**:

This course is an introduction to machine tools and metal-cutting processes used in manufacturing. Students complete projects that require precision layout, set-up, machining, and inspection. These projects require students to perform various operations on vertical milling machines, power saws and surface grinders. Students also have the opportunity to earn one or more NIMS Level 1 machining credentials including Job Planning Benchwork and Layout, Milling, Drill Press, and/or Surface Grinding. Writing assignments, as appropriate to the discipline, are part of the course.

**Course Prerequisites**:

Eligibility for Reading 99, or Consent of Department Chairperson.

**Students Course is Expected to Serve:**

Students enrolled in the Manufacturing Technology program with an interest in Computer Numerical Control (CNC) Machining.

**Course Objectives**:

1. Develop knowledge of job process planning for benchwork and machining projects.
2. Develop knowledge of metal cutting processes with vertical mill and surface grinder.
3. Know, understand, and follow OSHA safety rules and regulations in the shop.
4. Complete students projects demonstrating planning, layout and machining skills.
5. Earn a NIMS Level 1 manual machining credential.

**Student Learning Outcomes:**

Upon completion of this the student will be able to:

1. Apply shop mathematical formulas to calculate feeds and speeds for drill press and milling operations, and to find tap drill sizes.
2. Solve shop math word problems such as calculating the number of parts that can be made from given pieces of stock material.
3. Calculate production tolerances from final tolerances given on prints.
4. Apply the Pythagorean Theorem to calculate the diameter of round stock that can be used for rectangular milling parts.
5. Create workpieces for bench operations and machining projects using hand tools, layout tools, semi-precision and precision measuring tools.
6. Perform by hand: reaming and tapping of holes, filing and deburring, and cutting external threads.
7. Drill, ream, bore, counterbore, countersink and thread holes with a vertical milling machine and/or a drill press.
8. Operate safely and maintain horizontal and vertical band saws, drill presses, and vertical milling machines.
9. Set up machine tools.
10. Produce parts that conform to print requirements.
11. Verify parts to print specifications using precision measuring instruments.

**Recommended Texts and Course Materials:**

***Text:***

Hoffman, P.J., Hopewell, E.S., James, B, and Sharp, K.M. (2012). *Precision Machining Technology*. Independence, KY: Delmar Cengage. ISBN: 978-14354-4767-7

***Materials:***

Safety glasses

Vertical Mills

Surface Grinders

Related tooling, fixtures and measuring instruments

**Additional Course Requirements:** (N/A means this section does not apply to this course.)

N/A

**Recommended Methods of Instruction:**

The method of instruction will include lecture, small group work in the machine shop lab, and project-based learning.

**Recommended Methods of Evaluation:**

Formative assessments of student learning at the course level will be conducted by the instructor throughout the course on the project.

Hands-on student projects will be evaluated according to the following criteria:

Process Planning

Complexity

Accuracy

Workmanship

Your midterm and final grades will be based on the following assessments:

Chapter tests

Projects

Midterm and Final Examinations

Attendance

Grading Scale:

90-100% = A

80-89 = B

70-79 = C

60-69 = D

Below 60 = F

See the Policy on grade designations and grade appeals at:

<http://www.ccc.edu/colleges/daley/departments/Pages/Grade-Appeal-Policy-and-Procedure.aspx>

**NOTE:** Type or copy and paste the link above into a web browser to view its content.

### Topical Outline / Course Calendar:

1. Orientation and Safety (*OSHA Standards 29 CFR 1910*)
   1. Safety Rules and regulations. Safety videos.
   2. Personal Protective Equipment (PPE)
   3. Fire extinguisher, location and uses.
   4. All exits, route and aisle markings
   5. Lock Out/Tag Out
   6. Machine and Tool Guarding
   7. Electrical Safety
   8. Hazardous Materials
   9. Blood borne pathogens

II. Basic hand tools

III. Understanding Prints

1. Shop math for print reading: dimensions and tolerances
2. Parts list
3. Linetypes, symbols, titleblocks

IV. Introduction to Machinery’s Handbook

V. Precision Tools and Measurement

A. Semi-precision measuring tools: steel rules, protractors, feeler and radius gages, combination square set, transfer tools.

B. Precision measuring tools: micrometers, dial calipers, attribute (go/no go) gages

C. Surface plate tools: gage blocks, angle plates, height gages.

VI. Layout and Benchwork

A. Layout lines and points for drilling and milling

B. Filing

C. Hacksaw

D. Threading

VII. Sawing and Cutoff Machines

VIII. Vertical Milling Machine operations.

IX. Grinding Processes

A. Setup. Dressing grinding wheels. Magnetic chucks.

B. Operations.

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